

Claim rejections

Applicant respectfully traverses the claim rejections.

Claim 1 recites “a driving circuit for successively generating a plurality of write-in voltages, successively selecting each of said row lines and supplying said write-in voltages from end points of the column lines to the liquid crystal cells of the selected row line for a period corresponding to a distance from the selected row line to said end points; wherein said period corresponding to a distance increases as a function of the distance from the selected row line to said end points.”

The Examiner admits that this feature is not disclosed by Morita. However, the Examiner looks to Ueda, which discloses that “the precharge periods for the respective scanning lines are made longer with increase in distance from the drain driver 130 to the respective scanning lines” (see FIG. 13). The Examiner then writes that “It would have been obvious ... to combine Morita's supplying of data signal voltage signals that is shown in Fig. 9 with Ueda's use of pre-charge periods with respect to drain divers 130 as illustrated in Fig. 13, because the use of such drain drivers 130 in such a configuration helps make write voltage sufficient for the pixels disposed far from the drain driver as taught by Ueda” (office action, page 7).

This written explanation of the combination of Morita and Ueda seems to indicate a system that first uses the precharges of Ueda, and then uses the signal voltages of Morita, without altering either. As the Examiner admits that the periods of the signal voltages of Morita do not “increase[] as a function of the distance from the selected row line to said end points” as recited, this combination of the references would thus not teach the claimed feature.

Counsel for Applicant called the Examiner for clarification on December 15, 2008. The Examiner seemed to say that he could apply any period-distance relationship to the signal voltages of Morita, even if it was for some other kind of voltage, such as the precharge voltage of Ueda. It therefore appears that the Examiner proposes changing the periods of the signal voltages of Morita using the teachings of Ueda.

However, this is not a reasonable way to combine Morita and Ueda. First, the explicit teachings of Ueda would lead one of skill in the art to alter the periods of the precharges, rather than the periods of the write in or signal voltages, and in fact Ueda teaches away from increasing the periods of the write in voltages. Second, Morita teaches an alternative method of altering the period of the signal voltages; applying the period-distance relationship of the precharges of Ueda would conflict with Morita's alternative. Morita and Ueda each present a solution to the problem of deteriorated luminosity. Each does so in a different way. Each is different from the approach of the present invention. Neither Morita nor Ueda, nor any combination of the two, would teach one of skill in the art to create a system as claimed, "wherein said period corresponding to a distance increases as a function of the distance from the selected row line to said end points".

Ueda teaches varying the period of the precharge voltage as a function of distance. This is one way of addressing the problem of non-uniform illumination in LCD displays, somewhat similar to the related art method disclosed in the background section of the present specification:

To overcome this problem, Japanese Patent Publication 2002-182616 discloses a technique whereby variable supplemental voltages are generated and combined with write-in voltages. The combined voltages vary increasingly with the distance between the selected row line to the end points where the combined voltages are supplied.

Similar to these supplemental voltages, Ueda sends precharge voltages with a period-distance relationship, but does teach such a relationship for the signal voltages. This is the method that Ueda would teach to one of skill in the art for dealing with this problem. The Examiner is alleging that Ueda, which **does not** teach altering the period of the signal voltages in order to address the problem of non-uniform luminosity, and in fact teaches a different way of addressing the same problem, would suggest to one of skill in the art to alter the period of the signal voltages, is not a reasonable reading of the reference. The reasonable reading of Ueda is that it would suggest what it actually discloses, that is, adjusting the luminosity of the LCD by varying the period of the precharge voltages.

Furthermore, Ueda teaches away from increasing the periods of the write in voltages. Ueda discloses that “with the increase in the number of horizontal scanning lines in one vertical scanning period, time available for writing per horizontal line is decreased”, which can cause “pixel writing voltages [to become] insufficient” and display deterioration (col. 3, ll. 17-26). The solution of Ueda to this problem is alteration of the precharges. Ueda therefore does not teach or suggest increasing the period for writing, because a decrease in the time available for writing is the problem that Ueda seeks to counteract. If the writing periods were increased in the system of Ueda, then the solution that Ueda presents would be moot.

The purpose of pre-charging in Ueda is thus to compensate for a decrease in the allowable time for writing pixel data that is caused by an increased number of horizontal scan lines (col. 3, ll. 17-30). Ueda teaches away from applying the increased periods of the precharges to the writing periods, and therefore Ueda would not be interpreted by one of skill in the art as the Examiner asserts.

Additionally, even if Ueda could be read as the Examiner suggests, one of skill in the art would not apply these teachings to Morita. Morita discloses that his invention “has an objective ... of charging a selected pixel to a predetermined voltage within a predetermined time period” (col. 1, ll. 60-62). That is, Morita is concerned with keeping the signal voltage charging period sufficiently short. Morita accomplishes this by altering the voltage of the signal with “a voltage transformation circuit which changes a voltage of the data signal” (col. 2, ll. 8-9). These altered voltages can be seen in figures 10A-10C and 11A-11C. The approach of the Morita is thus different from the present invention, and one of skill in the art would not be motivated to combine Morita and Ueda to increase the write voltage periods to compensate for the amount of pixel voltage that is attenuated by increased length of column lines.

Altering the periods of Morita would be problematic for two reasons. First, as can be seen in figure 13 of Ueda, as the scan line gets farther from the drain drivers 130, the period of the precharge voltages increases significantly. If these periods were applied to the signal voltages of Morita, it would interfere with the basic objective of Morita, to keep the period of the signal voltages short, “within a predetermined time period”. Second, altering the voltage and altering the period of a signal voltage cannot be done independently; they interfere with each other. As one example, if a period of a pulse is T and the voltage is boosted by ΔV , then the energy is boosted by $T * \Delta V * I$, where I is the current. However, if the same voltage boost ΔV were applied for a period that is twice as long, 2T, then the energy would be boosted by $2T * \Delta V * I$, twice as much (although the current might change as well, further complicating matters). One cannot predict the effect of a change in voltage without knowing the change in period. The reverse is also true; one cannot predict the effect of a change in period with knowing the voltage. Thus, combining the changing periods of Ueda with the voltage changed signals of Morita would not

result in a system with the benefits of each, as the Examiner claims, but would rather result in a system in which the two effects would interfere with each other. A combination of references that renders them inoperable for their intended purpose cannot serve as the basis for a claim rejection (MPEP § 2143.01).

More to the point, Ueda and Morita both present ways of dealing with non-uniform luminance in LCDs (Morita col. 1, ll. 28-33; Ueda col. 17, ll. 46-50). One of skill in the art would use one or the other, not both. Not only would they interfere with each other if combined as asserted by the Examiner, as explained above, but combined in any way they would overcorrect for the problem. There is no reason why one of skill in the art would combine Morita and Ueda as the Examiner suggests.

Morita and Ueda each present a solution to the problem of deteriorated luminosity. Each does so in a different way. Each is different from the approach of the present invention. Neither Morita nor Ueda, nor any combination of the two, would teach one of skill in the art to create a system as claimed, “wherein said period corresponding to a distance increases as a function of the distance from the selected row line to said end points”.

Claim 1 is therefore patentable over the cited references. The other independent claims 11 and 15 recite analogous features and are therefore analogously patentable. The remaining claims are patentable at least due to their dependencies.

Allowable Claims

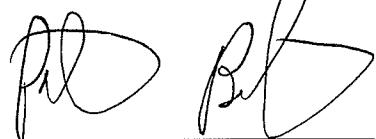
Applicant thanks the Examiner for indicating the allowability of claims 4, 7-10, 14, 18, and 21-24. Applicant elects to hold the rewriting of these claims in independent form in abeyance for the present.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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